

genus *Heterocampa*, which remind us of the strange appendages exhibited by the perfect insects of some *Homoptera*. As regards classification, Dr. Packard refers chiefly to the writings of Dr. Chapman, Prof. Comstock, and Mr. Walter; and after some criticism, he proposes the following scheme:—

Sub-order I. Lepidoptera Laciniata, or Proto-Lepidoptera (Eriocephala).

Sub-order II. Lepidoptera Haustellata.

I. Palæo-Lepidoptera (Micropteryx).

II. Neolepidoptera.

Dr. Packard's phylogenetic tree of the last section, which comprises all the *Lepidoptera* except *Micropteryx* and *Eriocephala*, is suggestive.

He recognises six main stems, one of which, the *Hepialidæ*, has no offshoot; four of the others are short, culminating in the *Megalopygidæ*, *Cossidæ*, *Sesiidæ*, and *Pyralidinae* respectively, while the sixth leads up from the *Prodoxidæ* past the *Psychidæ* and *Zygænidæ*, through the *Tineidæ*, to the *Lithosiidæ*, whence arise other branches, culminating in the *Nymphalidæ*, *Sphingidæ*, *Geometridæ*, and *Arctiidæ*.

We have said enough to indicate the immense interest and importance of this work, not only to all lepidopterists, but to all who are interested in the philosophic study of evolution. When will Governments or adequately supported Societies or Universities render it

We are puzzled by the remark that the discovery of the larva of the Australian genus *Chelepteryx* may throw light on the position of *Endromis*. Is he unaware that the full-grown larva of *Chelepteryx*, as figured by Scott, is covered with bristle-bearing warts, and is thus totally different from that of *Endromis*?

This paper also includes an analytical table of the genera of *Saturniidae*; and several genera, founded on known species, are indicated as new. Special attention is paid to larvæ, neurulation, and antennæ, in working out the phylogeny of the groups (of which a tentative table is given), and the neurulation and antennæ are illustrated with woodcuts. A special feature of interest is formed by the three photographic plates—one representing cocoons, and the others, taken from the living insects, representing the positions of several of the moths in repose. One of these is reproduced on this page. The paper concludes with a revised synonymic list of the North American Saturniids.

THE ZÜRICH FEDERAL POLYTECHNIC SCHOOL.

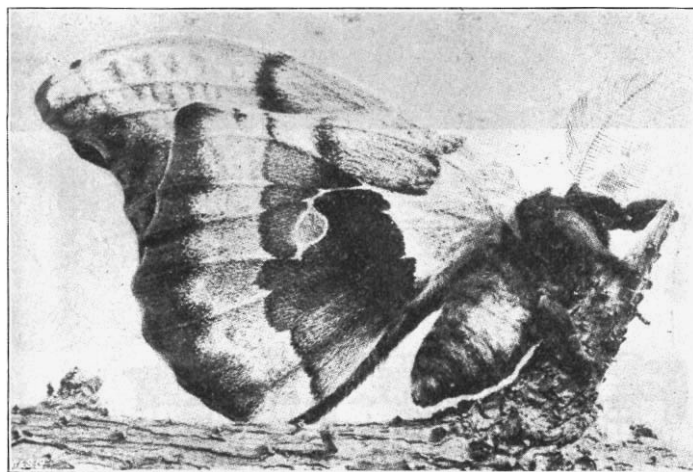
A RECENT number of the *Revue Générale des Sciences* contains a very interesting account of the Federal Polytechnic School at Zürich. Switzerland possesses one other such institution, namely, that at Lausanne.

The Federal Polytechnic School at Zürich is the only institution in that country, connected with higher education, which depends on the Confederation directly. As a natural result the school is much richer, and has been able to develop more rapidly. The students are all day scholars, and are divided into two classes: the *réguliers*, that is, those who go through a fixed course, and the *auditeurs*, those who work chiefly in the advanced division. The school opened in 1855 with 228 students. This number has increased every year, and in 1895 reached the total of 757. The courses of instruction are arranged under the seven following heads: (1) architecture, (2) civil engineering, (3) industrial mechanics, (4) industrial chemistry, (5) agriculture, (6) pedagogy, and (7) an optional course, in harmony with the six other divisions, which includes history, literature, modern languages, political economy, statistics, philosophy, fine art, and military tactics.

While endeavouring to preserve the character of a higher technical school, the theoretical instruction is also carried on as far as possible. The school has from the Confederation an annual subsidy of eight hundred thousand to nine hundred thousand francs, besides numerous other subsidies and revenues. With this income of over one million francs, not only are general expenses covered, but a number of additions can annually be bought. No money has, moreover, been spared on the erection of the laboratories, which are very numerous and spacious.

Fig. 1 represents the chemical school. It contains photographic, microphotographic, and pharmaceutical laboratories. The chemical analytical laboratory contains 166 single places, or 83 double; the double places, consisting of two tables back to back, are given to the more advanced students. Adjoining this laboratory are two balance-rooms, a dark-room, a room for electrolysis, one for analyses of gases, two for work of more advanced students, and another for physical chemistry. The laboratories for industrial and analytical chemistry are also divided into similar rooms.

The astronomical observatory is shown in Fig. 2, the principal feature of the illustration being the



Telega Polyphemus (Cramer) at rest.

possible for similar works to Dr. Packard's to be executed and published in Europe?

Mr. A. R. Grote, who has probably described more North American Lepidoptera than any other author, has lately taken up his abode in Germany, but has not therefore abandoned his interest in entomology. In the course of last year he published a sketch of the classification of *Lepidoptera* (partly following Comstock's system), in which he recognised a "super-family Bombycides," divided into four families—Bombycidae, Endromidæ, Agliidæ, and Saturniidae. In the present paper he modifies his views on the phylogeny of these families, and concludes, from his own and Dr. Dyar's observations on the earlier stages of the larvæ of *Bombyx* and *Endromis*, that they are allied to the *Lachnæidæ* (*Lasiocampidæ*), which is the first family of his "super-family" Agrotides (which includes the bulk of the Bombyces and Noctuæ), which must now take the name of Bombycides, leaving the "super-family" Saturniids to include only the two families Saturniidae (sub-families *Attacinae*, *Saturniinae*, and *Hemileucinae*); and Agliidæ (sub-families *Agliinae*, *Automerinae*, and *Citheroniinae*).



FIG. 1.

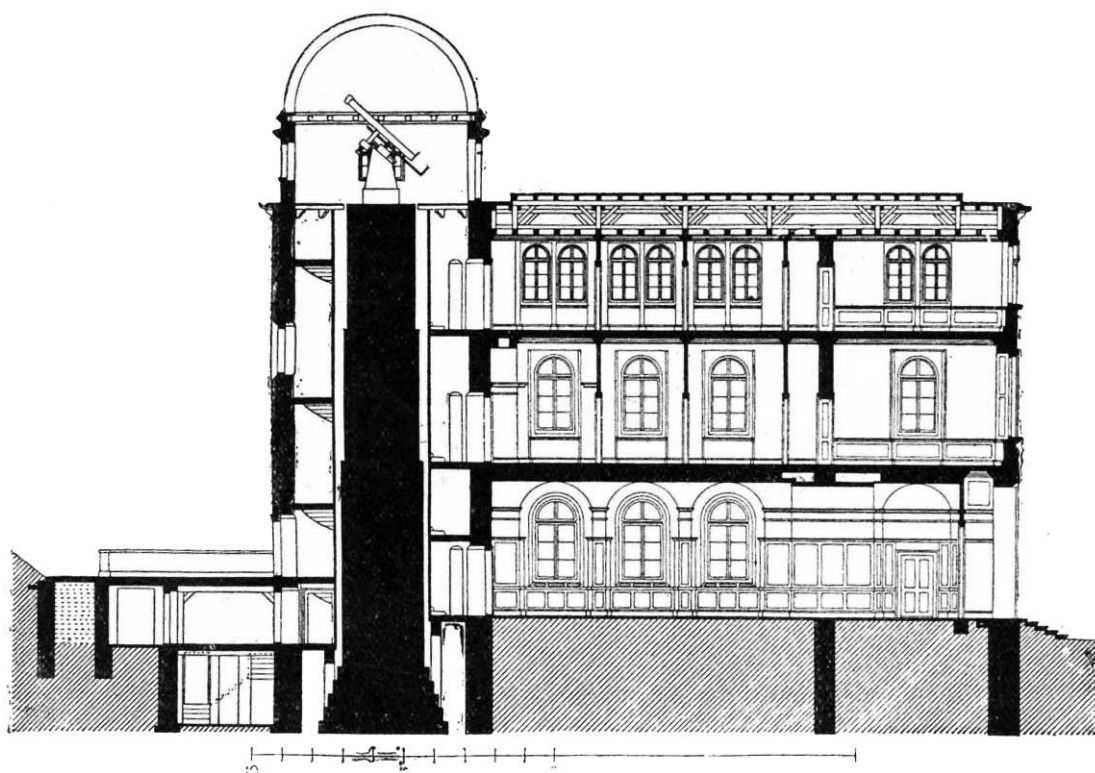


FIG. 2.

immense concrete pillar on which the equatorial rests. In addition to the laboratories already mentioned, there is an institute for physics, for photography, a workshop

for modelling in clay and plaster, in connection with the course on architecture; a workshop for working on metal and wood, in connection with the mechanical

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division; and, also, laboratories for pharmaceutical purposes and agricultural chemistry.

From this sketch it will be gathered that the courses of instruction are not only well provided for as regards laboratory equipment, but are thoroughly suited to the requirements of the students in every subject included in the syllabus.

SCIAGRAPHS OF BRITISH BATRACHIANS AND REPTILES.¹

ON May 5 last, Mr. G. A. Boulenger, F.R.S., reading a paper before the Zoological Society of London, on "Some little-known Batrachians from the Caucasus,"

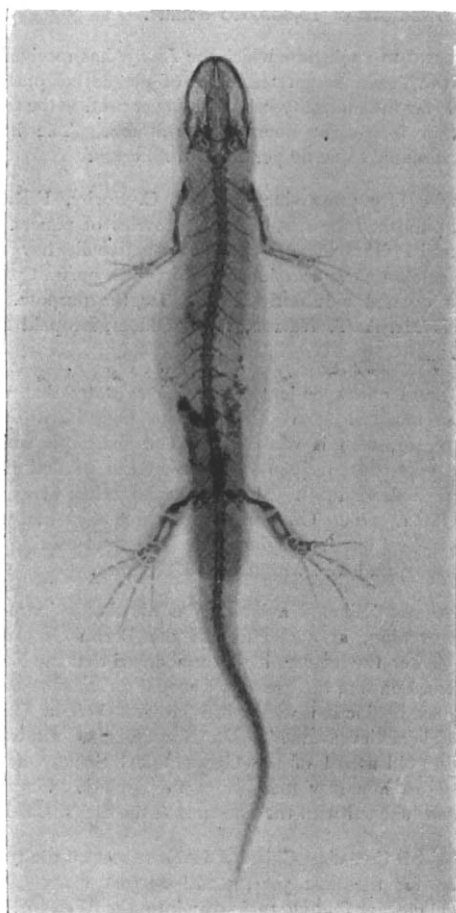


FIG. 1.

announced (*cf. P.Z.S.*, 1896, p. 552) the first outcome of the application of the Röntgen rays to herpetological investigation, having by their aid settled the systematic position of a unique batrachian without injury to the specimen. The event aroused in the minds of Messrs. Green and Gardiner a determination to repeat the experiment on a larger scale, with the result now before us—viz. a series of sciagraphs of all the British Batrachians and Reptiles, including the rare Smooth Snake (*Coronella austriaca*).

Two or three of the plates are indefinite, perhaps as

¹ "Sciagraphs of British Batrachians and Reptiles." Thirteen plates mounted, with portfolio. By J. Green and J. H. Gardiner. (Wallington, Surrey, 1897.) With an introduction by G. A. Boulenger, F.R.S.

the result of light printing, but the majority, for clearness and sharpness of definition, mark a very considerable advance upon anything of the kind yet published, and enable us the better to judge of the possibilities of the method as an aid to zoological and anatomical study. The plate of the Crested Newt (Fig. 1), which we reproduce, is especially noteworthy in this respect, and for the clearness with which the ossific nuclei of the carpus and tarsus are recorded. In the case of bones which, like these, are well isolated, and of those which are rod-like and dense, the method leaves little to be desired for purposes of general study and orientation of parts. Where thin flat bones exist, however, detail is not recorded; and as concerning the cranium, to which this remark especially applies, the appearances

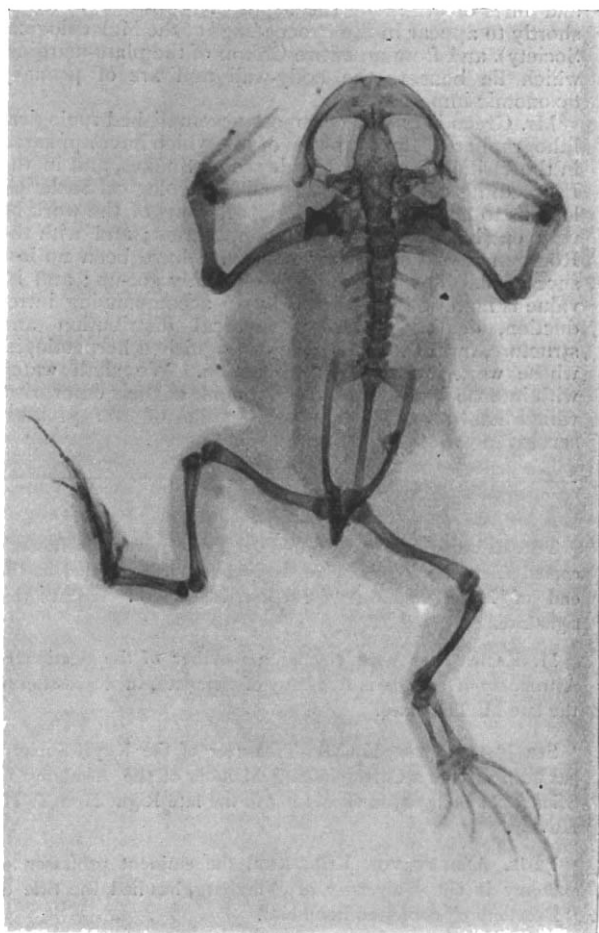


FIG. 2.

presented by some of the plates suggest delimitation of brain structure rather than anything that is osteological. Be this as it may, it is important to observe that marked indications of the soft parts occur in some of the prints—most conspicuously in the case of the large intestine, especially when fully laden with egesta largely composed of the elytra of beetles ingested as food. The area of overlap of the segments of the limbs and of not a few of the individual limb muscles is also rendered evident.

Detail is greatest in the figure of the Natterjack Toad, which we also reproduce (Fig. 2). Its lungs (like those of the frog of which a sciagraph by Messrs. Reid and Kuenen